AUSTRALIAN SOCIETY FOR LIMNOLOGY
INC

NEWSLETTER

Hot Exclusive ASL special report:

"I KILLED ELVIS!!!"

Blue-Green Alga tells all!

In a sensational exclusive interview with *Microcystis* sp. inside, we reveal all the sordid details of the debauched life of crime of the average toxic Blue-Green algal cell (also, a special Blue-Green diet p. 44).

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MEMBERSHIP DETAILS

The Australian Society for Limnology Inc. (ASL) is an association of over 400 people with professional or amateur interests related to Australian inland waters. Since its inception in 1961, the society has played an important role in fostering limnology in this country. The ASL promotes liaison between limnologists in academic, government and private institutions and has a vested interest in the conservation of aquatic and related resources. Annual conferences are held near centres of limnological interest, and the programme includes scientific sessions, field excursions and social activities.

The ASL regularly produces a newsletter with notes on limnological activities, articles of general interest, book reviews and announcements of upcoming events likely to be of interest to members. Occasionally, it produces a Special Publication series and a Directory of Members.

Membership applications are welcome from any person with an interest in limnology. Five classes of subscribing membership are available:

Ordinary members	$ 25.00
Student members	$ 12.50
Life members	$200.00
Institutional members	$ 30.00
Sustaining members	Fees on application

Membership covers the period from 1 July to 30 June and all members receive the regular and occasional publications produced by the society. Members may also choose to receive the Australian Journal of Marine and Freshwater Science, the Australian Journal of Zoology and/or the Australian Journal of Botany at special reduced rates. The subscription for each journal is based on the calendar year in which the subscription is paid.

Enquiries relating to membership should be directed to the Membership Officer:

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Material for publication in the June issue of the newsletter should be sent to the editors before the 22nd of May.

Contributions are welcome on any topic concerned with limnology (or anything else that may be of interest to the readers). Long articles should be forwarded as unformatted text on IBM-compatible discs, or as formatted text in any commonly used word processing package (e.g. WordPerfect, Microsoft Word, Wordstar). All those with Macs, send hard copy, or a disc to Leon (I bet you have those Russian 4-WD cars too). Camera ready copy can also be sent.

Cover: The cover shows just how desperate we are for good ideas ....

Editorial

Well, the usual response to the possible new ASL logo competition, as seen on the last cover. One letter! Just one lousy letter! And that came from JMC of New South Wales (hey, we hear you cry, wasn't that the person who originally sent in the suggested new logo, and who happens to still be the frontrunner for the wonderful prize, in the first place?). Be that as it may, here are some of the comments that JMC has received about his/her (all ASL competitions and entrants are secret) leading entry:

"Gee! Wow! Did you see that new logo on the cover of the last newsletter? Wasn't that just great! I'd just love to start the day with that logo on my ASL coffee mug!"

JMC's mum, Wagonga Inlet

"I honestly believe I prefer the scaly seal. PLEASE someone come up with something else!!!!"

Name withheld (fearing retribution from JMC's mum).

While not wishing to preempt the judges decision (which will be final, and only changed after the submission of an appropriate bribe), we feel that Name Withheld may just have something of merit to say (apologies to JMC's mum) on this point. Doesn't someone out there have one of those cute graphics packages with appropriate scanner (CorelDraw comes to mind - but we don't want to endorse brand names; well, not for free anyway) who can whip up an ASL logo to take the society into the next decade and century.

See you all at the conference in Hobart. Remember, keep those cards and letters rolling in.

CONGRATULATIONS

Congratulations are due to an ASL member, Dr. Mark Harvey of The Western Australian Museum. Mark has been awarded the Edgeworth David Medal, presented by the Royal Society of NSW for outstanding contributions by a scientist under the age of 35. Of course, the award comes as no surprise to the editors, as Mark was a co-winner of the Door Prize at the Albury Conference. And, as we all know, to win the Door Prize means the beginning of the real upward path in the career of any limnologist. We all extend our sincere congratulations to Mark on a fine and richly deserved award.

PRATTLE, RUMOUR AND SCUTTLEBUTT

A.C.T.

Correspondent: Richard H. Norris, University of Canberra, P.O. Box 1 Belconnen ACT 2616. Ph. 06 2522543 FAX 2015038

Alas the Federal Government in its infinite wisdom has seen fit not to fund a Cooperative Research Centre in Freshwater Ecology. This was to have been a joint venture between Monash University, University of Canberra, Murray-Darling Freshwater Research Centre and CSIRO Griffith. The consortium has been invited to apply again this year and many of those involved are keen to go again but a final decision is yet to be made. There is a huge amount of work in just applying and Peter Cullen must be seen as more than a little masochistic to lead the rest of us into it again. Let us keep our fingers crossed for the sake of the country this year.

Thomas Stuehrenberg is a German student visiting the Water Research Centre. Thomas is from Karlsruhe, a town near the French border with 260,000 people. Besides becoming acquainted with Aussies (as he puts it), Thomas came to Australia to carry out a some practical research for professional training which forms part of his study programme before he can apply for honours. His final report on aspects of denitrification of sewage will be assessed by his professor in Germany. Thomas is the fourth student to visit the Water Research Centre from Germany.

Vince Resh, from U.C. Berkeley, will be visiting the Water Research Centre in February during a brief visit to Australia before commencing a sabbatical in Germany.

Peter Cullen, Neil Jones, David Brand and Peter Morgan have recently completed a pre-impoundment study on likely water quality in Welcome Reef Dam. This dam is proposed to be built on the Shoalhaven River near Braidwood and would augment the Sydney water supply.

This year has seen the placement of 11 water science students in work experience over the summer. Employers keen to take our students include the Water Board in Sydney, NSW Department of Water Resources, River Murray Commission, Lower Molonglo Water Quality Control Centre, Territory Planning Authority and the Water Research Centre.

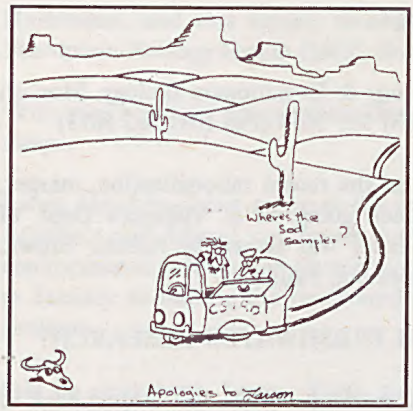
National Parks and Wildlife Service (N.S.W.)
Division of Wildlife and Ecology, CSIRO.

Correspondent: Sue Briggs, CSIRO, PO Box 84, Lyneham, ACT 2602

I have had my head buried in ducks' guts and behinds for a number of years and thought it was time to (re) emerge into the world of wetland limnology. Or rather into the world of dryland limnology. Having done my best to convince all and sundry that a wetland is still a wetland even when it is dry, I now want to convince all and sundry (this time including me) that most rangelands are really wetlands that are just going through a dry phase, and most plains are just lakes in drag.

Apart from (and as part of) this important work, we have four main projects running at present. The first one (funded by an Natural Resource Management Strategy grant) aims to determine how converting wetlands (= billabongs) to irrigation storage basins affects their waterbird communities (species composition, numbers, breeding). This study is also investigating whether paradigms in wetlands are lost, gained, shifted, or merely revisited. The project is based on the Murrumbidgee River and most of the work is being carried out by Steve Thornton. Another project is being carried out by Wayne Lawler, financed from internal funds including moneys from the sale of game licences to duck hunters. Wayne has recently fled the joys of inland wetlands to commence a project on estuary limnology (!). He is determining whether numbers and presence/absence of migratory waders (= birds to the uninitiated), on mud flats and sand banks along coastal rivers can be related to the nutrient status of the water and substrate where they (= the waders) are (and are not). His study area is coastal N.S.W. (with some private forays into Queensland). He is also looking at effects of disturbance by humans, dogs, etc. on wader usage of these areas.

We are continuing our monitoring studies of duck hunters, shooting effort, numbers of species of ducks harvested, and rainfall. Parts of this study go back to 1972 (commenced by Wayne Braithwaite of CSIRO), and we now have excellent data on relationships between species and numbers of ducks (indexed by catch-per-unit-effort), wetland characteristics and rainfall. This project is funded by game licence fees. It is an increasingly frustrating part of our work, due to the emergence of protest groups and the accelerating sense of being "the meat in the sandwich". Periodically, I vow to stop this monitoring process but it has become like certain drugs. Once you start, you cannot stop (especially with 21 years of data!). Our last main project is investigating impacts of cropping wetlands (when they are dry) on their functioning (when they are wet). Ifeanna Tooth is doing the nasty bits of this project (soil analyses). I am doing the nice parts like reading other people's papers and making wise comments.



Apart from physical and chemical analyses of cropped and uncropped soils we will be taking samples ("sods" in Boulton-Lloyd-speak) of surface soils from cropped and uncropped areas, and flooding these in the laboratory to measure the numbers of zooplankton that emerge. (In fact the Boulton/Lloyd sod method of investigating zooplankton abundance in ephemeral wetlands has excited me so much that I have a dream to collect sods of soil from all over Australia [Have you seen someone about this? - *Eds*], flood them and show that the entire continent (except for a few insignificant mountain peaks) is a giant ephemeral wetland just waiting to be reflooded and brought back to life. But I digress.). We also plan to try pitfall trapping for small mammals in the deep cracking days of the cropped and uncropped wetlands while they are dry. Or maybe we will just flood them and see what runs out! Limnology is a very (bio)diverse science these days. This project on the effects of cropping on wetlands is based on the Narran River, and is funded by N.S.W. Environmental Trust Grant.

Apart from the above projects I also find time to be involved in other people's projects on wetlands in other part of N.S.W. (e.g. Gol Gol Swamp and Lake, Macquarie Marshes, Lake Nearie and the Darling Ana Branch lakes). I also maintain a flickering interest in esoteric subjects such as energetics of reproduction, control of clutch size, and mating systems in waterfowl, and why flamingoes disappeared from inland Australia in the Pleistocene. Finally, for those bored with conventional limnology I recommend our new field of interest - dryland limnology. Truly, the science of the future whose horizons know no bounds! Watch this space.

VICTORIA

Correspondent: Barbara Downes, Dept. of Ecology & Evolutionary Biology, Monash University, Clayton 3168 Tel. (03) 565 5658 (Fax (03) 565 5613)

Well, as promised last time, here's a bit of info. on the recent rationalization, merger, restructuring, mid-life crisis or whatever that's been going on at Victoria's Dept. of Conservation and Environment. The following letter was signed by Alistair Brown, Manager of the Freshwater Ecology Branch of Flora and Fauna:

"WHAT'S HAPPENING TO GOVERNMENT FRESHWATER RESEARCH?

Significant changes have occurred in freshwater research within the Department of Conservation and Environment.

On the down side, there has been a significant loss of skills and expertise through resignations under an enhanced resignation package program and other causes. Government funding for freshwater research has also been reduced, forcing a rationalisation of the effort devoted to survey activity.

The loss of government funds has more than been made up for by an increase in external funding. The Murray Darling Basin Commission continues to be a major source of funding and for the first time the Arthur Rylah Institute has been successful in obtaining funding through ANPWS., the Australian Heritage Commission and Melbourne Water (the Board of Works).

Both through a redirection of Victorian government funds and as a result of the new Federal funding, the effort placed on native angling species and small native threatened species is now in better balance and targeted at developing management plans for species listed under the Flora and Fauna Guarantee Act. These changes all result from the freshwater research effort having been transferred from the Fisheries Management Division to the Flora and Fauna Division within DCE.

ARI research on aquatic invertebrates is being consolidated and is proving to be a powerful tool in identifying the effects of environmental mismanagement. It is envisaged that invertebrate research will in future play a key role in the development of standards for environmental care and assessing improvements in the aquatic environment as a result of integrated catchment management." [1]

Hmmmmm...and this epistle comes from Brendan Atkins about the doings of the Floodplain Ecology Group (DCE, Shepparton):

"You may not have heard much about F.E.G. recently, but we've been here, beavering away...

Lance Lloyd has been active at the not-so-recent environmental watering workshops in Armidale and Albury, conferring the benefits of our two years' progress in improving environmental flows to the Murray floodplain. Keith Ward hosted a workshop in Barmah in January to outline the on-ground changes we are proposing for the forest and its wetlands.

Still on workshops, Lance, Keith, Liz Beovich and I took part in the recent Barmah workshop on water and floodplain interactions. Paul Boon, you've done well!

Did you know that workshops were invented by the same people who brought us platform shoes and jumpsuits? Like these fashion items, the forum is enjoying new popularity among scientists: there is even a verb 'to workshop' (as in "We workshopped it").

Paula Hurst (mainly) and I have nearly finished the sorting and identification of an extensive set of macroinvertebrate samples from the 1990 Murray floods. The data will be analysed to look at flooding initiation and duration on assemblage development.

Brian Smith recently moved to Shepparton and collaborated on the gastropod collection. Brian is fresh from completing the ZooCat monograph for non-marine molluscs (now published by A.G.P.S., a snip at $49.50). He has since moved to Tassie and is revising the mollusc collection at the Queen Vic. Museum in Launceston.

It's all been too much for Colin Leitch; he's taken a year off from Conservation & Environment to commune with nature.

We welcome two new members to the Limnological Republic of Northern Victoria: Michelle Jenkins and Marcus Cooling, both fresh from Honours at Adelaide Uni. Michelle's role is technical assistant. Marcus has received a vacation studentship to knock our 'wetlands' bibliography into shape.

Another 'Water for Murray Wetlands' bulletin will be circulating soon (one year after the first issue)."

Peter Tyler dropped me a note to remind me that he has joined the ranks of Victorian limnos. After 30 years in the Apple Isle, he has accepted the Foundation Chair of Aquatic

Science at Deakin University, Warrnambool campus. Peter will move over in March (stop that sobbing noise Leon) and start work on estuaries with staff members there.

Quite a few readers will have attended the latest taxonomy workshop at MudFreaks. This year's topic was Coleoptera, with 4 speakers: John Laurence, Chris Watts, Andrew Calder and Monash's own Alena Glaister, who had her first taste of public speaking and the opportunity to offload many years of valuable work on such annoyances as *Austrolimnius*. We'd like to thank and congratulate John Hawking for organizing yet another very worthwhile taxonomic event [Here here - *Eds*].

Congrats to Gerry Closs, late of Monash and still awaiting the outcome of his Ph.D. examination, who is the newest face on staff at the Albury-Wodonga campus of La Trobe Uni, where he'll be lecturing (and lecturing and lecturing.....).

And now a few words on Ian Bayly, who's been quietly racking up some significant publications. Ian currently has 5 papers in press, of which the most important is a revision of *Boeckella* (which are calanoid copepods) occurring in South America and on sub-Antarctic islands. The paper will be published this year in *Revista Chilena Historia Natural* after a very long gestation: Ian started work on it when on study leave in London in 1977, when he examined all available material in the British Museum. Since then, he has picked up the ms and put it down more times than he can remember before finally submitting it in 1990. Ian's other contributions include a key to the non-marine Centropagidae (more calanoid copepods) of the World (look for that in SPB Academic Publishing), and a comparison of the fauna of salt lakes in Australia with that of the Altiplano of South America (this will appear in a book edited by Stuart Hurlbert). Ian actually visited and collected from salt lakes in the Bolivian section of the Altiplano last year, his highlight for 1991.

Student news....John Kirkwood, judging by the groans from the computer room, is well into the throes of writing up his Ph.D. on Antarctic beasties, and there are new Ph.D. students in the limno. lab. - Jacqui Jordan, who has recovered from streamaphobia induced by Honours, and Maria Vazquez may be coming from Barcelona to work with Sam on an as yet unnamed stream project. Sam's main concern is that Maria may have to fend off jokes from people who've watched too many Fawlty Towers reruns....

[1][Possible translation by an unknown person - "There have been some changes in freshwater research in DCE over the past year. Despite serious efforts by the powers-that-be to alter the structure of the Department by sending the forces to various parts of the state (i.e. Fisheries to Geelong, Flora and Fauna policy to Wangaratta, Research to stay in Melbourne but with a 2 year use-by date), somehow we ... er ... they have managed to survive. But not unscathed. Several staff with long-term experience were lost in the

process, and general budget cut-backs have forced changes to the focus of the research activities (like the scaling back of the Silvicultural Systems Project).

Luckily, external funding has been available from various sources to keep staff on while still conducting some good work. The Murray Darling Basin Commission is funding a project looking at radio-tracking Murray Cod (headed by J. Koehn) and some fish and invertebrate work on the Mitta Mitta River (to be done by J. Koehn and T. Doeg); the ANPWS is funding preliminary research on three endangered native fish species (by Steve Saddlier and Tarmo Raadik), the Heritage Commission is funding fish and invertebrate work in East Gippsland (T. Raadik) and Melbourne Water is funding fish and invertebrate work on the upper Yarra River (T. Doeg and S. Saddlier). Of course, the funding is short-term, ranging from 3 months to 3 years, and being conducted mainly by exempt contract staff, so the future is insecure, but a little more promising than before (i.e. during the restructure).

The move of research from Fisheries to Flora and Fauna has changed the focus of freshwater research from mainly exploitative to including a significant component of the conservation of native fauna; overall a very promising development. The introduction of invertebrate experience into the department also increases the ability to conduct balanced research into the aquatic environment. Only the future will tell whether these changes will be maintained.

Oh, and the restructure? Surprisingly, with a change of Minister came a change of heart. All moves are off, the proposed Research Division is off, and it's business as usual (well, almost)."

NEW SOUTH WALES

Correspondent: John Hawking, MDFRC, P.O. Box 921, Albury NSW 2640. Ph. 060-431002, Fax. 060-431626.

Inland Fisheries Research Station

Since Christmas, it's been busy as usual around Narrandera. Peter Gehrke has been following movements and survival (perhaps it would be more correct to say lack of movement and mortality!) of fish larvae and juveniles in flooded sections of river red gum forest, with lots of smelly black water. An early flush of extra water through the forest improved water quality which no doubt helped some fish to survive. Paul Brown, expeditionist extraordinaire, has managed to snare some interesting fish larvae out at Menindee and in the Paroo following flooding. The roads out there are something else,

as Paul spent more time replacing bits that fell of the 4WD, boat and trailer than he did travelling and sampling. I'm sure it had nothing to do with the driving. Enter Ron Patra. Ron has started his PhD at UTS and is doing his experimental work at IFRS on the effects of variable temperatures on toxicity of chemicals to fish and invertebrates. The fish breeding season was a good one again, but not quite up to last years bumper crop, so Steve Thurstan has been out collecting more broodstock to replace a few worn out, tired old females.

Murray-Darling Freshwater Research Centre

The second week of February was workshop week, with the staff involved in organizing two workshops. Paul Boon conducted the "Second Wetland Workshop" at Barmah Forest from 12-14 February (full report later in the newsletter) and John Hawking the Fourth Taxonomy Workshop, 11 -12 February. It was a hectic time for many of the Centre's staff, but it was worth the effort as the workshops were very successful.

The Taxonomy Workshop this year focused on some of the difficult groups of aquatic Coleoptera. Dr John Lawrence (ANIC) handled the identification of the adults and larvae to family level, followed by Dr Chris Watts (Museum of South Australia) with identification of adults and larvae of the families Dytiscidae and Hydrophilidae, Ms Alena Glaister (Monash University) the elmid larvae and Andrew Calder (ANIC) the elmid adults. Next year we hope to tackle the aquatic worms [Ha ha ha ha - *Eds*].

Two new staff, John Pengelly (Environmental Chemist) and Helen King (Environmental Biologist) have joined the Centre. John formally worked for the Queensland Government Chemical Laboratories and will run the chemistry laboratory and conduct routine chemical analyses. Helen was previously involved in aquaculture with Dampier Salt (W.A.) and will work for Terry Hillman conducting biological monitoring of the paper mill effluent from ANM's mill at Albury.

Rochelle Semmler, a vacation employment student, has completed her project on the "Gas flow and methane release through *Eleocharis sphacelata*" with Brian Sorrell. David Mitchell and Rod Oliver visited Mildura and where they had discussions with the Sunraysia Water Board, Mildura Shire Council and Water Resources, and presented a public seminar at the TAFE College on the current research that is being undertaken at the Centre.

SOUTH AUSTRALIA

Correspondent: Marcus Brownlow, Department of Botany, University of Adelaide, S.A. 5000.

Botany Department, University of Adelaide

December saw the Botany Department wandering without guidance or direction, because the aquatic botanists (George Ganf, Marcus Brownlow, our summer student Ben Taylor, and ex-Honours student Giles Flower) were at Bool Lagoon conducting a mammoth vegetation/sediment/topography survey around the lagoon perimeter. Some 8000 quadrats later a huge data set had been amassed, and it only needs about a thousand years work for it all to be analysed. It was a good opportunity for us to try out our new whizz-bang Global Positioning System (GPS). This hand-held marvel lets the orbiting US satellites tell you exactly where you are on the surface of the Earth with astonishing accuracy (+/- 30m). George Ganf has also found it very useful for the relocation of off-shore fishing sites!

Giles Flower and Alison Hay rekindled their Honours liaison on the banks of the River Torrens while conducting an integrated Botany/Zoology survey of the Linear Park for Land Systems EBC (see below). The Torrens system consists of no more than about a dozen native aquatic plant species, distributed patchily along the length of the Linear Park. The communities were characterised by generally low diversity, with many stands being monospecific. Old prams and unloved empty 2 litre Coke bottles were excluded from the survey! [WHY? - *Eds.*]

The real highlight of recent botanical happenings was the Barmah forest workshop brilliantly organised by Paul Boon from MDFWRC. After the gruelling 12 hour drive to Albury, George Ganf, Marcus Brownlow, Peter Adcock (ex-Honours but looking for a scholarship) and Corinna Lange (current Honours but looking for sympathy) were able to check out the Albury Laboratory of MDFWRC (we were impressed), before heading to Barmah in convoy. Barmah forest is an enormous red gum floodplain, quite different to what we had imagined, and very different to the aquatic systems of south east swamps which we are used to [Grammar! - *Eds*]. There were few species in common, but the life forms of those present closely resembled the plants we would have expected to see. Evenings were spent in urgent discussion, and the whole workshop was both successful and enjoyable. Well done Paul, and other speakers and helpers.

Zoology Department, University of Adelaide

As the last ASL newsletter ambled its way into press some of us (Jim Puckridge, Fran Sheldon and Andrew Boulton) were fortunate enough to be about 1000km from anywhere populated. Fran and Andrew joined Jim on another of his Coongie Lakes expeditions. Jim completed his ecological studies of the native fish communities in the region, Fran searched for and collected some data on diets and microhabitat preferences of the elusive gastropod fauna and jointly Fran and Andrew conducted a smash and grab survey of the aquatic macroinvertebrate communities in both lakes and channels of the system (some interesting bugs but still lots of sorting to do). The region is spectacular beyond description and its beauty, although markedly modified by cattle grazing and mining, really highlights what a dreadful state many of our river systems are in. It is worthy of World Heritage listing and in an attempt to protect the region from future degradation Jim is campaigning strongly for strong catchment management practices to be implemented for the entire Lake Eyre Basin.

Another blue-green summer has nearly passed us by and a new year dawns. January saw two pre-honours Zoology students (John Dalton-Morgan and Kirrilie Rowe) team up with Dr Keith Walker to undertake a faunal survey of the River Torrens for Land Systems EBC (the project was run in conjunction with Dr George Ganf in the Botany Department - see above). Their summer break was spent intensively searching for faunal diversity amongst shopping trolleys, plastic bags and hypodermics that unfortunately contribute to the habitat diversity of Adelaide's main aquatic centre-piece. They recommended a greater effort be made to conserve and enhance the biotic remnants of this system.

Dr Christine Campbell (post-doc) has extended her studies with Bill Williams to include some artificial salt lakes, the evaporation basins associated with the lower River Murray, while she waits patiently for the natural salt lakes of the Coorong to fill with water.

A batch of wet and damp Honours students have invaded the Zoology Department, there is a sudden panic to get projects underway as they realise that it is now nearly a month since enrolment ... more news next time.

State Water Laboratories

Dennis Steffenson, Mike Burch and Peter Baker are heavily involved with cyanobacteria (toxic and otherwise) particularly with regard to public meetings and other meetings. On his off day last week, Mike broke his arm (drunk again!).

Phil Suter, Jenny Beer and Peter Goonan have been analysing wetland data collected over a flood period in 1990/91 when substantial areas of the River Murray floodplain were inundated. Sorting and identification of macroinvertebrates is never-ending, and keeps at

least Jenny and Peter out of mischief (insane though). Phil attended the Coleoptera workshop in Albury, and advertised the limnological advantages to working in South Australia - only 2 species of elmid, and they are easy to identify, and no *Austrolimnius*. Ah, paradise!

Rhonda Butcher came over and entertained us with her small project on the conservation of non-marine invertebrates [We're not sure Rhonda will appreciate her project described as "small" -*Eds*]. Hopefully her results may stimulate funding for research on said beasties!

A summer student worked with Phil Suter on chromium and *Chironomus* with some interesting results. At the pollution source of chromium the *Chironomus* larvae concentrated chromium about 1000x above sediment concentration. The dry weight of the larvae was 50% chromium. If it had been iron, maybe magnets could be used to collect midges. We are checking the results! [Any chance of passing such samples under a magnet *before* sorting them? - *Eds.*]

WESTERN AUSTRALIA

Correspondent: *Dr* Jane Chambers, B.E.S., Murdoch University, Murdoch, W.A. 6150.

Wild exciting news from the West! [This had better be good - *Eds.*]

Murdoch University

Record rainfall in the supposedly dry W.A. February has forced Jane Latchford and Declan Morgan to consider yet another unexpected environmental variable, and caused them to wonder whether a degree in meteorology should be a prerequisite to environmental studies. With water levels in local wetlands as high as winter levels, this coming year could prove interesting.

While Launa Chalton's field study site (Millstream) was north enough to avoid the deluge, it didn't prevent her from experiencing an unexpected interference. A lost foreign tourist, in an attempt to gain the notice of a rescue party, set fire to surrounding bushland leaving Launa's subtropical oasis more than a little charred.

A new addition to our research force, Thailand masters student Siripong Pornpiapat, struggled gamely with a large two wheel drive vehicle that bogged in a local wetland (another victim of the record rain). Siripong is currently assessing the success of Alcoa's artificial wetlands at Wellard.

Congratulations to Kerry Trayler upon graduating with first class honours. Kerry was promptly introduced to the fact that academic qualifications do not necessarily lead to stability, having had to occupy three different office/labs in recent weeks. Kerry is now safely ensconced in the nerve centre of wetland research in Murdoch!

Jenny Davis recently breathed a double sigh of relief with Ivor Growns and Mark Lund submitting their long awaited and much vaunted PhDs. Ivor, Jane and Beth beat a hasty retreat from Perth summer to the cooler climes of Tasmania, by all accounts they are settling in very well. Mark in characteristic laid-back style got married the day after submitting his Phd and also fell victim to our wettest ever day (this however, did not dampen proceedings). .Faye Cheal has completed her work on the forty wetlands study and is busy preparing her long awaited trip overseas.

Two new limnological honours types starting this year: Carol Wilkins will be looking at the environmental impact of artificial maintenance of water regime at Banganup Swamp, Perth, while Ron Glasson will be looking into remote sensing of wetland vegetation degradation at Koobidge Creek, near Esperance.

And Jane Chambers and Nicola Fletcher, in cooperation with Ray Froend and Celeste Wilson are sifting through megabytes of data, wondering if perhaps they had been a little too keen in their search for ways and means to propagate and establish sedges, rushes and bulrushes. They are currently getting excited about producing a "user-friendly" handbook to summarise their findings, complete with pretty pictures. See us 1993!

University of W.A., Zoology : Aquatic Research mob!

Don Edward and Pauline Gazey have just completed the first(?) survey of macroinvertebrates in 23 lakes on the coastal plain from Cape Naturaliste to Albany. Pauline is just starting a postgraduate diploma which will look at the effects of sedimentation in Jarrah forest streams.

Belindah Murray is analysing data prior to that joyous time of thesis writing (PhD) on the persistence of macroinvertebrates in temporary Jarrah forest streams.

A study of stream energetics, recently compiled by Peter Davies showed a tight relationship between stream discharge and community metabolic processes (respiration and production). This will be an important tool for managing compensation releases from water impoundments in the Jarrah forest. The PhD goes on.....

Don Edward has recently published (with Peter Cranston) a review paper on the chironomid sub-family Aphroteniinae in Australia. Just when you thought you were out of bedtime reading!

Louis Lebel has recently submitted his PhD thesis (Yay Louis!) dealing with the ecology of Trichoptera in (guess where?) Jarrah forest streams. He is currently working on impounded streams in Thailand.

And David Cale, having sussed out how invertebrates respond to rehabilitation techniques at AMC Wetlands Centre is now shifting to a "modification of habitat" approach.

Centre for Water Research

David Hamilton and Geoff Schladow have returned recently from Sydney after successful meetings with personnel from the Sydney Water Board. The purpose of the meeting was to report on the progress of the Prospect Reservoir water quality modelling project. Results were presented using GS's new multicolour Spyglass software and they were most impressed with the 16.7 million colours used by GS. The results graphically illustrated some of the water quality changes likely after diversion of the reservoir inflows.

David and Geoff are currently working with the Board to try to initiate some new water quality projects. Areas of mutual interest include the release rate of metals from sediments and the water quality effects of artificial destratification.

Jörg Imberger has been awarded a Gledden Travel Award for a three week field trip he is currently undertaking in Chile. The trip fulfills a life long interest in the dynamics of the large range of lakes scattered throughout Chile. The lakes span an unusually wide range of hydrodynamic regimes, latitude and altitude. It is believed that there is a great deal to learn by investigating this unusual pristine set of lakes. The visit is being undertaken with a view to learn more about the programme in physical limnology offered by the participating institutions in Chile, to obtain an introductory understanding of the hydrodynamic regimes in the Chilean lakes and finally to inform colleagues in South America about the work that is being undertaken at the Centre for Water Research. (P.S. Most recent reports from Chile indicate that the team will try to trek as far south as the South Pole.)

The Centre for Water Research and the Geomechanics Group at The University of Western Australia have been successful in receiving a grant of $289,000 to introduce a practical industry related laboratory programme into the environmental engineering course. The new programme will allow final year undergraduates to go out in the field to gather data from industrial and agricultural study sites, process and analyse the data, model the field studies physically (at small scale) and numerically, and then participate in management decision processes. The new curricula will be developed and coordinated by a new appointee and field sites will be developed in conjunction with industry groups and state authorities who have already expressed their willingness to participate.

W.A. Water Authority

Congratulations are due to Shirley Balla who recently commenced work with the W.A. Water Authority. This prestigious position entails editing and compiling for publication the results of the five jointly funded AWRAC projects. Progress on her PhD is continuing.....

A set of maps has been produced on the classification (using Seminuiks guidelines) and evaluation (a la' EPA) of all areas vaguely wet on the Swan Coastal Plain, including wetlands, river channels, drains, damplands, you name it. Should be very useful. Alan Hill has been dobbed in as a contact if you are interested.

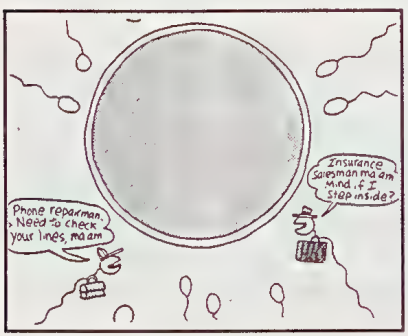
Mass invasion of us westerners due to arrive Bronte Park, April. See you there!

SOUTH QUEENSLAND

Correspondent: Brad Pusey, CCISR, Griffith University, Nathan 4111

Fieldwork, fecundity and flying about the world are the order of the day in CCISR.

Martin Read has just returned from 3 weeks in the Burdekin region in November. The area is at its hottest and some would say most beautiful (although Marty would argue the point) at this time of year. From there, it was straight to Fraser Island to assist Chris Marshall on the Honey Blue Eye project. A nice bludge on the beach was expected but not encountered. From there, it was down to holiday in Tasmania. Mark Kennard has also returned intact from field work on lagoon fish communities of the Normanby River of Cape York. Netted crocodiles are not only encountered in PNG (ASL Newsletter 29 (4)) but the reaction is basically the same.



CCISR staff are doing their best to increase Australia's population growth, some more so than others. In an engrossing contest of population poker, Deb Harrison, with a little help from Brad Congdon, produced an ace, a little boy, Lindsay. Selina Ward upped the ante with a set of twins due in the mid- year and Jan Mclean, met that hand with another pair also due mid-year. Arrangements are underway to cut out parts of their benches so that they may remain at their microscopes as they grow. Selina

was one of the many unfortunates who got embroiled in the Christmas Compass debacle but was fortunate to get a seat on another airline due to the pregnant mothers clause for which she more than amply qualified. Congratulations to all!

Stuart Bunn is currently on study leave, part of which has been spent in God's country (W.A.) and the remainder in Canada. Angela has also been on study leave, spent in various parts of the world, including New Zealand and Sth Africa. During her stay in Sth Africa, Angela visited a large number of limnologists and water resource managers. CCISR was able to reciprocate by hosting a larger number of said people during their visit to Queensland. A symposium and workshop on flow allocation was held and the fruits of that meeting are due for publication in the proceedings of the recent Armidale conference on "Water allocation for the Environment". Angela is now on a short holiday in Tasmania and CCISR is without a Director.

My PhD thesis has been certified as being fit to be bound, placed in a library and never to be read again. I can now return to contemplating the complications of research in artificial streams, the difficulties of research on fish communities, epistemology in general and my navel in particular.

NORTH QUEENSLAND

Correspondent: Paul Clayton, Department of Zoology, James Cook University, Townsville, Qld 4811. Ph: (077) 81 4520; E-mail: zlpdc@marlin.jcu.edu.au

Our lack of a regular correspondent since the departure of Ros StClair has meant little news from up here (well none actually) since September last year - sorry about that! I've taken the reins now and I'll try to keep everyone up to date.

After the biggest wet in recent years (early 1991), North Queensland has had a record dry. Rain has only just begun falling again in the past few weeks giving the waterways a much needed boost and generating sighs of relief from everyone.

The Australian Centre for Tropical Freshwater Research has continued its involvement in a variety of floral and faunal consultancies (terrestrial and freshwater). Contracts have been completed for the Civil Aviation Authority (proposed radar sites), the Army (proposed extensions to their local military exercise area) and Lee Benson has just returned from a short visit with the bunch at Ok Tedi. Of course, the dunder duo (Jane Orr and Zoe Rosser) and myself (chief dunderhead) are continuing with the CSR Dunder project - nearing the end at last!

[We didn't tamper with that last paragraph, we swear - *Eds.*]

The ACTFR has now moved most of its bits and pieces into the University's new research building and our water chemistry lab is developing rapidly under the guidance of Barry Butler. Our instrumentation now includes an ICPMS, an AA (actually two of them), a nutrient analyser and there's rumour of a Mass Spectrometer for isotope studies. By the way, that's the rumour that goes along with the prattle and scuttlebutt.

Richard Pearson is keeping the Birthday Creek research effort going with, amongst other things, some tile experiments. Zoe Rosser has successfully completed her Honours on disturbance in Birthday Creek and will be staying on to do a PhD. I'm still plodding along with my PhD on waterfall ecology (although until recently its been rocky outcrop ecology!) and I think I've strained every muscle known whilst dangling from my ropes.

Steve Richards has returned from a frogging trip in PNG and managed to get a lot of specimens back through customs - many may be new species. He is now working with Ross Alford preparing a frog inventory for the Wet Tropics Management Agency. Around Townsville, several projects are underway in urban waterways including Allan Webb on Tilapia (also other nasties!) and Ian Roderick on fish communities in the Ross River. We will also have Michelle Devlin, a new masters student, beginning soon.

South of Townsville, George Lukacs, Jacqui Nolen, Morgan Thomas, Lee Benson and Bob Congdon are proceeding with the Burdekin Wetland Study. I hear that the barramundi fishing is good - if only they could prevent their boat from drifting unattended into croc infested waters (Congratulations to George for surviving the swim to retrieve it). Also in the Burdekin, John Faithful continues with his Lake Dalrymple limnology and, amazingly, the lake was blue for a few months recently.

Well that's about it this time except that Richard Rowe has just told me that he is still looking at aggressive behaviour in dragonflies and that there are indications that the adult classification is in need of revision. That should please all you Odonate types!

Cheers!

TASMANIA

Correspondent: Leon Barmuta, Department of Zoology, University of Tasmania, G.P.O. Box 252C, Hobart, 7001.

Limnology brain drain slurps freshwater expertise from Hobart. It is with great sadness that your correspondent reports that he is now Horwitz-less, Hamr-less and will soon be

Tyler-less too. Anyway, we all wish Pierre Horwitz all the best with his new, tenured position at the Joondalup campus of Enid Blyton, ...er sorry, Edith Cowan University in W.A.. There are probably a few crayfish and other hole-dwellers heaving a sigh of relief at his departure, but the rest of us sorely miss his energy and humour. Premek Hamr, another crayfish-botherer, has departed for Canada via Europe with wife Lee and two children in tow - or should that be the other way around? Premek's presence is still with us in the form of artwork for the next Congress, and a number of disoriented *Galaxias pedderensis* swimming around their new home in the Western Arthurs. Good luck, Prem, and come back soon. As for Peter Tyler, he's off to become foundation chair of aquatic sciences at Deakin University in Warrnambool. All this after he told me a mere 12 months ago that "sadly my days as a boundary rider at the frontiers of limnology are over"; I didn't believe it then, and I don't believe it now. Peter has been at the Botany-cum-Plant Sciences Department at the University of Tasmania for *n* years, where *n* is a largish number. In that time he has been a tremendous champion for the conservation of Tasmania's fabulous freshwater and wilderness assets, and has established an equally fabulous basis for lacustrine limnology in this State. For most of those *n* years Tyler was Tasmanian limnology, and probably still is. His prodigious output is matched by his enthusiasm and popularity as a teacher, and there are many long-faced undergraduates stalking the corridors around here right now. We are all sorry to see Peter go and wish him every success in his new appointment. Tasmania's loss is Victoria's gain.

[Ed 1: "You did it!! You wrote something about Tyler without mentioning the 'T'-word" Ed 2: "What, you mean 'Trai..'??]

However, the Inland Fisheries folk are still around for me to talk to. They have just purchased the building next door spelling an end to those halcyon days of balancing microscopes and Macs on alternate knees while answering the phone with one hand and sorting samples with their feet. Jan Barton and Laurie Cook (and anyone else not fast enough to get out of the way) have been chasing planes spraying pesticides as part of an on-going project on the effects of such substances on aquatic life. Peter Davies continues to do far too many things for me to gossip about here, and I'm sure Paul Humphries and Mary Mulcahy have been doing interesting things as well, but they always seem to be in the field. Someone should put a stop to that. I daresay the new Government will reorganise them... oops! They just have. Inland Fisheries is no longer part of Primary Industries and Energy, as of about five minutes ago. Noone knows what that means yet, apart from more wasted letterhead.

Hobart was visited by bits of the LWRRDC, and a meeting about funding priorities was held (some would say appropriately) in Wrest Point Casino. Surprisingly many of the different "client" groups came up with similar wish-lists, so there are grounds for cautious optimism about the future of collaborative research in Tasmania.

Um... what else? Alistair Richardson is back after amphipoding in Millport, Scotland for six months. He looked quite relaxed for a bit, so I took him away on the Field Zoology course he thought he'd handed over to me, and he now looks as frazzled as the rest of us. Jean Jackson and Belinda Robson are now the Tasmanian experts in aquatic Coleoptera after returning from the workshop in Albury. The rain has at last stopped falling, and there is a good chance the Barmuta-Jackson Brick Show will at last examine near-bed flows rather than bed-load transport of NuBrick Pinestone Pavers. Ivor and Jane Growns have returned to Tasmania from Murdoch and are now shivering, jobless in some garrett in Battery Point. All job offers should be sent to the Keep Ivor and Jane Smiling Society, c/o the above address.

Well that's what we're all up to in our spare time. Mostly, however, we are organising the next congress. Come on down!

NORTHERN TERRITORY

Correspondent: Peter Dostine, ARRI, Jabiru NT 0886

ARRI

All's quiet in frontline Australia. Monsoonal troughs have come and gone over the past few weeks, but so far the wet season has been a major disappointment for one and all.

Planned waste water releases from Nabarlek mine in Arnhem Land were canceled following discussions between the Northern Land Council, representing the interests and views of aboriginal land owners, and the NT authorities. OSS had positioned staff to conduct stream-side monitoring prior to and during the release.

Here at ARRI Honours student Rachel Paltridge has finished sampling for her project on colonisation of benthic invertebrates in the temporary reaches of Magela Creek, and is now frantically compiling data. We've also had the pleasure of occasional visits (actually he came in to flog the spare pool table) from blues harp whizz Michael Douglas. (See last Newsletter for details.) Dr Grant Farrell (CSIRO Entomology) presented an excellent seminar on the biological control of that destroyer of wetlands, *Mimosa pigra*.

On the fishy side of things Bob Pidgeon has been spending time setting up monitoring programs for aborted releases, watching no fish migrate up Magela Creek [must be nearly as interesting as a Royal Visit - *Eds*], scanning an impressive backlog of data and ruefully considering the prospects for the coming barra season.

The Biological Monitoring section of ARRI is about to embark on a project to examine the effects of mine tailings on the benthic invertebrates of Magela floodplain. This work will assist in determining which of two long-term tailings storage options is appropriate - either an above or below ground repository. The study will include both field and laboratory trials in this assessment.

NT Power and Water Authority

Simon Townsend reports that the very dry 91/92 wet season has had an impact on several Water Resources Division research projects. The collaborative project with CSIRO (see "D" for Douglas) on the impact of different fire regimes on runoff water quality has become a bit of anon-event. Early results show there is no impact when runoff is absent. The lack of rain highlights the variable nature of rainfall in the wet/dry tropics and the necessity to replicate seasonal trials.

Kevin Boland returns to PAWA in April, after three years leave without pay to complete a doctoral thesis on the limnology of two reservoirs near Mt Isa.

PAPUA NEW GUINEA

Correspondent: Ross Smith, Environment Department, Ok Tedi Mining Limited, P.O. Box 1, Tabubil, W.P., P.N.G.

As I have not been able to obtain any other contributions, this section will be restricted to Ok Tedi and Porgera activities. Hopefully some more PNG limnos will be bored by it and make the effort to send me some news.

Mathew Kawei from Porgera writes:

The field work has just begun for the 1992 year. The program kicked off with joint sampling with OTML along the Fly River Delta. The emphasis this time was placed on collection of tissue samples from mud clams (*Geolina similis*) and barnacles (*Balanus patelliformis*), to examine their suitability as biological monitors for trace metals. Additional species collected were mud crabs (*Scylla serrata*) and banana prawns (*Penaeus merguiensis*).

We are looking forward to seeing the results of trace metal analysis. However, our enthusiasm for future sampling trips will be much less because of the effort required in collection these specimens. Soft mud up to waist level made it hard to walk and one often had to crawl on the belly in pursuit of mud clams at some sampling sites.

The biggest news at Ok Tedi has been the drought which has been the most severe since 1982. Drought is a very relative term, and here it means that the January rainfall in Tabubil was only 468mm compared with an average of 685mm. "What is all the fuss about?" I hear the more arid zone people cry. Well for a start it meant that all the Christmas goodies for Tabubil were stuck on a ship on the Fly River until February, and Hercules (the aircraft, not the Greek bloke) had to be chartered to bring in essentials like milk, rice and flotation reagents. Not on the same aircraft, fortunately. It has also meant that bits of the Fly floodplain are actually dry, so there has been a flurry of limnological activity to find our what do the fish do during droughts, and how does the chemistry of the remaining water change? All very interesting and important and not easy to get stuff. Barre Kare's team have been collecting fish on the floodplain by dragging dinghies full of nets over the mud to find the remaining water. Geoff and Melinda Day have been doing similar things to get water and sediment samples.

Meanwhile back in the labs, it has been annual report time and many late nights have been spent working over hot silicone chips [what, no fish? - *Eds*], number crunching and word processing. Not all that conducive to an even temperament and all far too much like thesis writing - of which Melinda is still not saying anything.

Albert Yeviura left for greener pastures, or possibly seas, for a position as Fisheries Surveillance Officer for the New Guinea Islands region. As you can imagine, having to spend your life checking how the fishing is around New Britain, New Ireland and other such golden sanded, palm fringed, crystal clear watered islands is not a job for everyone (mutter, mutter), and Albert took the job for purely altruistic reasons. However, he seems to be stuck in Port Moresby temporarily which I gather he is not too pleased about.

Well that is the end of the available PNG news. I hope I can gather a bit more next time.

LIMNOLOGICAL STUFF

WHOOPS!!!

** SPECIAL 1992 CONGRESS ANNOUNCEMENT **

Well did all of you spot the deliberate mistake on p.2 of the Congress mail-out? That's right: if you students send in your applications for the student subsidy by May 29 you'll miss the congress. **Applications for the student subsidy should be sent to Richard Marchant by MARCH 29.** Details of rules later in this newsletter.

CALL FOR JOLLY AWARD NOMINATIONS

The Jolly Award commemorates Hilary Jolly, a founding member of the Australian Society for Limnology and is presented to a person who, in the opinion of the Society, has made an outstanding contribution to Australian limnology. The Jolly Award is the society's most prestigious award, considered by members to recognize scientific excellence and outstanding achievement.

Any person may be nominated for the Award, but nominations may only be made by financial members of the society. Nominations must be seconded by another financial member of the society and must include a brief supporting statement and a current copy of the nominee's curriculum vitae. Nominations remain valid for 3 years. An award is not necessarily made each year.

The full regulations governing the award have been published in the Newsletter, Volume 28, Number 1, February 1990.

Nominations are now called for 1991 and should be forwarded, by 21st April, to: Dr I.C. Campbell, Water Studies Centre, Monash University, East Caulfield 3145, Victoria.

INTERNATIONAL SOCIETY FOR LIMNOLOGY (SIL) CONGRESS IN AUSTRALIA?

The International Society for Theoretical and Applied Limnology (SIL) (of which you should all be members) holds congresses every three years. This year the congress will be held in Barcelona, Spain, and future congresses will be held in Sao Paulo, Brazil in 1995

and Dublin, Ireland, in 1998. The SIL is now endeavoring to encourage more equitable sharing of the congress between northern and southern hemispheres, the only previous southern hemisphere congress having been held in New Zealand in 1987. There have been several extremely subtle hints from the powers that be in SIL that Australia may be a suitable location for the congress in 2001. And after all if they can manage it in New Zealand! As a result we are considering preparing a bid, on behalf of ASL, to invite SIL to hold the 2001 congress in Melbourne, probably at Monash University (while Sam Lake is away on sabbatical leave). The bid would have to be presented to the SIL executive in Barcelona later this year. An item has been included on the agenda of the AGM to allow discussion of the proposal and to seek endorsement by the membership. Any members who have strong views on the matter and may not be present at the Mienna Congress could forward comments to me (Fax (03) 571 3646, or Richard Marchant before the meeting.

Ian Campbell

SUGGESTED CONFERENCE GUIDELINES

Abstracts:

a) These must be received 4-5 weeks before meeting to allow time for printing;
b) They should be no larger than 16.5cm x 12.5cm to allow two abstracts to be printed per A4 page;
c) Do not accept faxed copies of abstracts as they usually do not reproduce well; if faxes are sent they must be followed by originals via the post;
d) Print 200-250 copies of the abstracts only; this total will obviously depend on the anticipated numbers attending the meeting. (To keep members who can not attend informed the titles of papers could be published in the newsletter.)

Posters:

a) Maximum space available for display must be determined; individual posters could occupy 1m x 1.5m, but this is a decision for the organisers;
b) Pins and sticky tape should be provided by the conference organisers;
c) Organise a poster viewing session that does not clash with any talks.

Programme:

a) Each talk should last 15 minutes with an additional 5 mins for questions;

b) The programme of talks should be set out in the front of the booklet containing the abstracts; leave tea and coffee breaks of 20-30 mins in the morning and afternoon of each day on which sessions are held; and 1.5 hours for lunch;

c) If two concurrent sessions are to be held then 3 sets of slide projectors and overhead projectors (2 plus 1 spare) must be available;

d) AGM minutes (of previous conference) and AGM agenda for current meeting should be obtained from the secretary and incorporated at the end of the booklet containing the abstracts.

Finances:

a) All monies associated with the conference should go through the ASL's general account; the number of this account must be obtained from the treasurer when planning of the conference begins;

b) A cheque book for making payments must be obtained from the treasurer.

Richard Marchant, Secretary

STUDENT TRAVEL AWARDS

Applications are invited from research students for travel assistance to attend and present a paper at the 31st Annual Congress of the Australian Society for Limnology to be held at Bronte Park, Tasmania on 25th-27th April 1992. The purpose of this assistance is to encourage students to present the results of their work in public. Students who are carrying out research in any branch of limnology for a higher degree are encouraged to apply. The following rules apply to this assistance:

1. Applicants must be full-time postgraduate students at any Australian University, College of Advanced Education or Institute of Technology. There is no age limitation. Applicants must have been current financial members of the ASL for at least 6 months.

2. Assistance will be granted on the recommendation of a panel of three appointed by the Society.

3. Applications must include a written statement of no more than 2000 words describing the research, its significance and the stage that has been reached. This statement must be endorsed by the student's supervisor. An abstract of the paper that applicant proposes to present must also be included.

4. Award of assistance will be judged on: (i) significance of the work; (ii) originality and soundness of the research; (iii) the progress made and whether the stage has been reached where something useful can be presented; (iv) ability to present a clear and concise statement of the study.

5. Applications must be lodged with Dr Richard Marchant, Museum of Victoria, 71 Victoria Crescent, Abbotsford VIC 3067, by the 31st of March 1992 (not 29th May as on flyer!). Successful applicants will be informed by the 7th April 1992.

STUDENT PRIZES AT THE 1992 CONGRESS

Since no-one objected to the suggestions for student prized published in Newsletter 29 (3), here are the details of and rules for the THREE student prizes on offer at A.S.L. Congresses from now on.

There will be three student prizes of books (chosen by the recipient) to the value of $100. The prizes are:

1. Prize for the best oral presentation by a Ph.D. or Masters student.
2. Prize for the best poster presentation by a student.
3. Prize for the best oral presentation by an Honours student.

Posters will be assessed during the dedicated poster session and must be attended by the author, who will explain the presentation and field questions. There will be no oral sessions concurrent with the poster session. The Honours prize was felt desirable because for a number of years members have felt that recent Honours graduates are less experienced at oral presentations and are therefore disadvantaged compared with other graduate students who have nearly completed their research. We hope this prize will encourage recent Honours graduates to attend Congresses and share their results with other members of ASL.

To be eligible for a student prize, students should be current, financial members of ASL, and must give their presentation within 18 months of receiving their degree. This "18 month rule" may be varied if successive Congresses are more than one year apart (so for 1992 at least, 18 months is it!). The student prizes will be judged by a committee or committees convened by the ASL Executive at the Congress. Wherever possible, such committees will not contain supervisors or co-authors of candidates for the prizes.

Leon Barmuta, El Vice Presidente

60 MINUTES

Minutes from the Annual General Meeting held during the conference at Lorne, July 1991

14 July 1991. AGM Erskine House, Lorne, Vic.

The meeting started at 3.35 pm. (P=proposed, S=seconded).

1. Agenda adopted (P: P. Cullen, S: J. Davis)

2. Apologies: J. Harris, B. Congdon, A. McComb, I. Smalls, D. Harriss, T. Hillman, J. Koehn, B. O'Connor, K. Bowmer, L. MacMillan, P. Davies, R. Swain, D. Holdway, S. Barson.

3. Minutes of last AGM accepted (P: L. Barmuta, S: J. Hawking). No matters arose from these minutes.

4. President's report: S. Bunn presented his report which will be published in a forthcoming newsletter.. He thanked M. Hart and R. Marchant for their organisation of the conference at Lorne. The report was accepted (P: L. Barmuta, S: J. Davis).

5. Secretary's report: Four meetings of the executive were held during the year- 2 teleconferences and 2 meetings. Minutes of these were published in the newsletter. Most of the correspondence dealt with during the last year concerned routine matters. FASTS correspondence had been published in the newsletter and was not discussed further. A letter from Hamar Midgley, a long standing member of the society, was read out. Hamar was writing to resign from the Society as he has reached an age when he felt he could no longer take an active part in such a society. The secretary had replied regretting his decision but understanding the reasons for it. Report was accepted (P: G. Ganf, S: R. Shiel).

6. Treasurer's report: The society has 460 members at present. A financial statement (attached) was submitted. She noted that journal subscriptions would increase by $5.00 this year. She also thanked P. Freeman for all his help in setting up the new computerised membership system. Report accepted (P: T. Doeg, S: L. Lloyd).

7. An honorarium of $1000 for the treasurer was proposed (I. Campbell; S: R. Norris) and passed unanimously.

8. Auditors report: This was read out by the secretary and accepted (P: I. Campbell, S: J. Hawking).

9. Editor's report: S. Bunn had published a brief report in the last issue of the newsletter. This was accepted (P: L. Barmuta, S: R. Shiel).

10. Newsletter editors' report: The editors thanked all the regular contributors, especially J. Hawking & B. Williams, for their efforts. R. Shiel noted that he was getting very few items for the limnology bibliography. Report accepted (P: J. Chambers, S: B. Hart).

11. Jolly award: This year an award was made to Prof. Arthur McComb. The last winner (I. Campbell) read out the citation which will be sent to the newsletter. (P: J. Chambers; S: A. Arthington).

12. Student Award: The committee (L. Barmuta, P. Boon, I. Campbell, P. Horwitz, J. Roberts) assessed 16 presentations given by students. The prize was awarded to B. Gawne; a subsidiary prize was given to S. Blanch (this consisted on a book donated to the society by K. Bowmer). L. Barmuta suggested that a separate prize be given for posters and that the value be increased from $50 to $100 for each prize. (P: T. Doeg, S: J. Davis). This was carried unanimously.

13. Student travel awards: These were given to M. Lund ($530, Murdoch Uni, WA) and B. Congdon ($360, Griffith Uni, Qld) and covered the costs of return apex air fares to Melbourne. Supervisors were again asked to bring these awards to the attention of their students. (P: I. Campbell, S: R. Shiel)

14. Door prize: The committee (T. Doeg, L. Barmuta, B. Downes) awarded this year's prize to Nick Drayson. A number of participants received special mention and these and other details will be published in a forthcoming newsletter.

15. Future congresses: The next (31st) congress will be held in Tasmania on the weekend after Easter, 1992. It will be held at Bronte Park and will include a one-day workshop on the effects of forestry practices on fresh waters. It is hoped that child-care facilities will be available; participants will be asked to notify whether they need this facility on the registration forms.

In 1993, S. Bunn suggested holding a congress in SE Qld. He suggested Noosa Heads or Stradbroke island as possible locations. It may also be possible to arrange a joint meeting with the Ecological Society of Australia who are holding a conference in this region in 1993.

In 1994 two venues for congresses were suggested: Rottnest Island, WA and the Sydney region.

16. Election of the executive: the following were elected unopposed:

President: S. Bunn (P: R. Marchant, S: M. Hart).
Vice President: L. Barmuta (P: T. Doeg, S: S. Lake)
Secretary: R. Marchant (P: L. Barmuta, S: B. Hart).
Treasurer: M. Hart (P: R. Marchant, S: R. Shiel)

State members:

R. Edwards (Vic) (P: I. Campbell, S: R. Marchant)
J. Hawking (NSW) (P: P. Sorrell, S: " ")
R. Congdon (Qld) (P: R. St Clair, S: " ")
P. Dostine (NT) (P: J. Hawking, S: " ")
P. Horwitz (TAS) (P: L. Barmuta, S: " ")
J. Chambers (WA) (P: J. Davis, S: " ")
M. Brownlow (SA) (P: A. Boulton, S: " ")
R. Norris (ACT) (P: S. Bunn, S: " ")

17. Election of auditors: M. Hart proposed (S: R. Marchant) that Coles Pty Ltd act as auditor. Passed unanimously.

18. General Business:

a) Increase in annual fees: The executive recommended to the meeting that annual subscriptions be increased as follows:

Ordinary members	$25.00
Student members	$12.50
Institutional members	$30.00

to enable the society to meet increased FASTS fees (now $3.80) per member and to provide additional funds that are needed. There was some discussion on this matter, particularly on whether the society should remain a full member of FASTS. Eventually B. Hart proposed (S: D. Mitchell) that "the ASL remain in FASTS as a full member for the next year and that the executive review the situation again before the next AGM" - this was passed unanimously. The members then voted on whether "to increase fees to $25 for ordinary members, $12.50 for students and $30 for institutions (P: R. Marchant, S: M. Hart) - this was also passed unanimously.

b) Australian Foundation for Science: The secretary explained that the Society has been invited to join this organisation, whose initial aims are to foster scientific education particularly at the secondary school level. However, joining fees are $1000 per year for five years. The secretary had responded to the foundation by indicating that the ASL had too small a membership to afford such annual fees but that it was willing to provide advice and information if asked.

c) Land and Water Resources Research and Development Corporation (LWRRDC): Angela Arthington (a board member of this corporation) gave a brief summary of the status of this Federal Government organisation (within Dept. Primary Industry) which has taken on the role that AWRAC formerly had. Apparently the ASL does not qualify as a "representative organisation" that could advise the corporation (eg. about research priorities) because it is not seen as a "user" of the type of research work that the corporation is likely to fund. There was discussion about what should be the ASL's response to this exclusion and it was recommended that the executive pursue this matter by writing to the LWRRDC. It was also noted that members could lobby about this and other matters via the ACF, which is a representative member.

d) SIL congress in Adelaide: A convention centre in Adelaide has approached to ASL to seek support for holding a SIL congress in 2001. This matter will be investigated by the executive. The ASL needs to find out from G. Harris (Aust. SIL representative) what procedure is needed and what details are required in order to put a proposal to the SIL executive. B. Hart has also offered to look into this matter. A straw vote of members indicated unanimous support for the Society sponsoring such a congress.

e) AJMFR: Anne Grant (editor of this CSIRO journal) indicated she was happy to consider proposals for special issues of the journal on limnological topics. She should be contacted directly with any suggestions.

f) Support for limnologists in underdeveloped countries: Brad Mitchell suggested that the executive should consider sponsoring limnologists from such countries to attend ASL conferences, or provide funds to them so that they can subscribe to limnological journals. I. Campbell noted that AIDAB had in the past (1989) provided money for Thai biologists to attend an ASL meeting.

The meeting finished at 5.35pm.

R. Marchant, Secretary.

ASL Executive Meeting by Teleconference 28 November 1991

Present: R. Marchant, S. Bunn, M. Hart, J. Chambers, J. Hawking, L. Barmuta.

Apologies: R. Edwards, P. Horwitz, M. Brownlow, R. Oliver.

Meeting Started at 4.30pm.

1) FASTS AND LWRRDC (the corporation).

S. Bunn reported that FASTS does not seem to be able to influence the LWRRDC to change its policy about ending core funding to the current water research centres. FASTS suggested that the ASL try lobbying the coalition parties. The secretary will contact Peter Cranston, who attended the FASTS' AGM on ASL's behalf, to get the latest views on these matters.

L. Barmuta agreed to draft a letter to the ACF formally offering the services of the ASL to comment on LWRRDC matters. The ACF has been accepted as a "representative organisation," by the corporation. Such organisations will have a major impact on LWRRDC decisions.

2) Financial Matters:

The treasurer (M. Hart) indicated that the figures in the following table represent the state of the Society's finances up to the end of September.

General Account Balance 1/4/91				$7895.88
Receipts			**Payments**	
	May	$ 6841.00	April	$ 476.16
	June	$14636.00	May	$ 2224.13
	July	$ 6541.60	June	$ 1647.89
	August		July	$ 5889.35
	September	$ 2192.18	August	$ 2824.30
		$38106.66	September	$19588.25
				$32650.08
Balance 30/9/91				$ 6062.58
Common Fund Balance 1/7/91				$36533.13
Conference July 1991				
	Receipts			$27440.50
	Payments			$24943.70
				$ 2496.80

Conference major expense items	
Postage	$ 232.00
Biscuits	$ 168.00
Wine/Beer (ex Melbourne)	$1369.66
Printing	$1650.00
Bus Hire	$ 336.00
Name Tags	$ 198.00
Erskine House, Accommodation, Dinner Lunches, Cocktail party	$18819.00
Caravan Park	$ 1530.00

3) Conservation working group:

S. Bunn suggested that ASL form a conservation working group to report on aquatic conservation matters especially those concerned with freshwater invertebrates. A note will be put in the newsletter asking for interested members to write to S. Bunn. P. Horwitz had (via the Secretary) indicated before the meeting that he would be keen to be a member of such a group.

4) SIL Conference in Australia in 2001:

SIL National representative (Graham Harris) does not know what details are needed in order to make an offer to host a SIL conference. The secretary has been in touch with Ian Campbell about this matter and will ask Ian to write a note for the newsletter about developments. Ian has suggested that Melbourne (ie Monash Uni) could be a suitable venue; he is investigating accommodation with the appropriate authorities at Monash.

5) Tasmanian ASL Congress 1992:

L. Barmuta reported that this conference will be held on 25-27th April at Bronte Park. A poster session will be scheduled for Saturday (25th) morning and will not clash with oral presentations. A symposium on the impact of forestry or hydrogeneration activities on rivers or lakes, which was suggested originally for the 24th April, will not now occur as cooperation with the relevant authorities has not been obtained. Transport from Hobart to Bronte park and child care will be provided. Further details will appear in the first newsletter for 1992.

The Secretary promised to produce some conference guidelines. It was suggested that instead of printing sufficient copies of abstracts for all members (about 500) that the titles only of the papers given at the Conference should be printed in the newsletter.

The congress in 1993 will be held in SE Qld. Details will be presented at Bronte Park.

6) Awards for School Students:

M. Hart suggested the ASL consider giving awards to secondary school students to encourage interest in freshwater biology in particular and science in general. She will investigate this further.

7) Biological collections:

J. Hawking brought to the meeting's attention the decision of a recent conference in Canberra on Biological Collections that all collections (at museums, research institutes) should be part of an overall national scheme. He will write a note about this for the newsletter.

8) P. Cranston's report (obtained after teleconference):

P. Cranston agreed at the Lorne meeting to act as the ASL's liaison officer with FASTS in Canberra. He attended their recent AGM and together with D. Widdup (FASTS Executive Director) brought to the attention of representatives of the coalition parties the difficulties the ASL had experienced with the LWRRDC; in particular, he pointed out the fact that the ASL, as a scientific organisation, was unable to become a "representative organisation" for the corporation.

P. Cranston, on behalf of the ASL, has also written a submission for the current review of ABRS. In this he stressed the need to keep the users of taxonomic information uppermost in mind when selecting priority groups for study.

Meeting finished 5.30pm, R. Marchant Secretary.

BARMAH FOREST WORKSHOP

Following the success of the "First Wetland Workshop" at Bool Lagoon last year, the "Second Wetland Workshop" was held at Barmah Forest from 12-14 February 1992. Thirty people attended, including representatives from the Murray-Darling Freshwater Research Centre (Albury), the Murray-Darling Basin Commission (Canberra), University of Adelaide (Botany and Zoology Departments), University of New England (Botany Department), the Floodplain Working Group and Kaiela Fisheries Research Station (Shepparton) from the Victorian Department of Conservation and Environment, the Victorian Rural Water Commission (Tatura), New South Wales' Inland Fisheries Research Station (Narrandera), Monash University's Centre for Stream Ecology and CSIRO (Griffith). Emily Stanley (University of Arizona) also came, although it must be admitted that the Workshop was not her sole reason for coming to Australia. Alas, three people from the South Australian Department of Planning and Environment had to withdraw at the last moment. We stayed at the luxurious (but threatened with closure by the evil bean counters) Dharnya Centre in the middle of the Forest, and enjoyed the honest tucker provided by the Barmah Anglican Women's Guild. Max Moor and Jack Hutchison, both rangers with the Department of Conservation and Environment, helped us with their valuable local knowledge, as did Keith Ward from Shepparton.

The Workshop was divided into short talks on specific issues regarding the management of the forest, its surface-water and ground-water characteristics, the use of the floodplain by fish, and the dynamics of the vegetation. Between talks, we ventured into the forest to see the moira-grass plains, red gums, billabongs and other wetlands. Overall, we had a good time and (I hope) learnt much about the forest and the often conflicting issues in its management. The talks, in particular, provided a series of provocative views. Needless to say, almost all people gave a 150% effort: Andrew Boulton, George Ganf, Lance Lloyd, Jane Roberts and Haikai Tane were especially noticeable in the vigour of their discussions, and Brian Sorrell gave perhaps the most animated talk ever seen in academia. The next "Wetland Workshop" is rumoured to be held in Armidale by Marg Brock's group: details will be forthcoming.

Paul Boon, Albury.

COMMENTS ON ASL BIBLIOGRAPHY

With the ASL Bibliography a regular feature of the Newsletter, I often find myself flicking in vain for THAT reference that I remember seeing in some time ago, but can never remember the Newsletter volume, year of publication, or author. It would be of great assistance to me, and I imagine many others, if ASL could produce an incremental

bibliography every five years or so. This could build into a substantial collection of accessible work, with papers organised alphabetically and/or chronologically in each issue.

The success of the bibliography would of course depend on members continuing to send in their publication details, but most importantly, someone would have to compile the information and enter it into a database for presentation. As anyone who has changed reference systems from card to computer knows, this can be a mammoth and tedious task. However, there is perhaps an additional advantage that members may be able to log into the database from a remote computer and search for references of their choosing. If security or set-up time is a real problem, perhaps the file/s could be distributed on floppy to interested users? The usual problems of selecting a package that most members own or are willing to buy would complicate the issue, but these are not insurmountable.

The bottom line is that members have published a lot of useful information that in many cases, is not readily available to other members. I for one am looking for ways to access some of these papers.

Peter Gehrke.

How to become the most popular person in Australia Department:

A RESEARCH ASSISTANT POSITION AVAILABLE NOW THAT THE MONEY HAS COME THROUGH.

The Aquatic Resources Center (Nashville, Tennessee, USA) and the Department of Invertebrate Survey, Museum of Victoria (MOV), will be hiring a research assistant for 2-3 years to study the taxonomy and distribution of the aquatic Oligochaeta of Australia. The applicant will work in the USA for the first six months with Dr R.O.Brinkhurst in Tennessee, studying his collections of identified Australian and other species. Following this, the applicant will work at the MOV at Abbotsford, Victoria, under the supervision of Dr R. Marchant. Field work will be undertaken in streams of the south east of Australia, in the Snowy Mountain lakes and in Tasmania. Applicants are not expected to have any previous experience of worm taxonomy, but should have experience with the collection and identification of freshwater aquatic invertebrates, microscopy and histology. Word processing and illustrating skills would be an asset. Applicants should have a first degree in biology as a minimum. Salary will be determined on the basis of qualifications on a scale applicable to the Victorian public service.

Please direct all enquiries to Dr R.Marchant, MOV, 71 Victoria Crescent, Abbotsford, VIC 3067; phone (03) 4195200, fax (03) 4160475, before the end of March 1992.

BETTER LATE THAN NEVER

Outline of speech given by Ian Bayly on the occasion of Dave Morton's farewell from the Department of Botany and Zoology, Monash University (as it was then) on 4 May 1990.

Towards the end of 1972 a very quiet, shy and polite young man by the name of David Morton came knocking on my door to ask if I would supervise his Honours work in 1973.

He was at this stage, as I have said, very polite and reserved, and I could have relied on him to say "Yes, Sir, No, Sir, Six bags full, Sir".

However, I have to report that this is no longer the case. Eighteen years later this *formerly* quiet, shy and retiring young man now tries to bully me and boss me about, and sometimes even abuses me! He also criticises my work, but not unfairly, I should add - always thoughtfully and constructively.

So, Dave, in 18 years you've undergone a substantial metamorphosis from someone who was very shy and - dare I say it - somewhat introverted, to a highly competent and self-assured person who doesn't hesitate to cross swords with the so-called academics, especially when they show signs of being *obstreperous*!

Anyway, to return to November/December 1972, I agreed in a weak moment to take on this unknown quantity in the form of David Morton.

It is interesting to look at the 1973 Honours class for a moment. It was a small group consisting of initially four and finally three students.

Well, it's a matter of history that not only did Dave do Honours with me, but also did his Masters under my supervision and stayed on to become my *technician*. That may be the formal description of what he did, but it's an entirely inadequate description of what he did. In fact, he became my trusty, loyal and highly respected colleague, co-worker and sometimes co-author.

During his Honours year and immediately afterwards, I taught Dave just about all I knew about cyclopoid copepods. In retrospect, what I knew about these beasts was not very much at all! However, this didn't matter. What I gave Dave he ran with, and he ran with it so strongly that he became the Australian national expert on freshwater cyclopoids. Not only this, he now has an international reputation with this group.

Let me say something about Dave as a person rather than a scientist. No one in this Department has been more generous with his or her time in helping others than has Dave Morton. When in trouble, a large number of people in this Department immediately turn to Dave. Dave, you are the universal Mr Fix-it! You are going to be sorely missed, not only by me, but also by just about everyone else.

Someone said it all at the last Departmental Meeting, when, according to Annabel's Report "We will be unable to replace him for approximately three to four months" - someone said "We will be unable to replace him, fullstop!"

Dave, as a technician, colleague, independent researcher and personal friend, you have been magnificent. Not only have I been very lucky, we have all been very lucky and we are very sad to see you go. However, I know that the Australian Journal of Zoology, Invertebrate Taxonomy, and Australian Wildlife Research will all flourish under you Editorship. Just as you can immediately spot the differences between two sibling species of copepods, so, too, will you spot all the printing errors in these journals!

NEW BOOKS, etc.

Wetlands: their ecology, function, restoration and management is a compilation of proceedings from a series of workshops covering theoretical and applied aspects of wetland management held at La Trobe University in 1989. Cost $32.50 plus $3.00 postage from La Trobe University Wildlife Reserves, La Trobe University, Bundoora, Vic 3083, fax (03) 479 1188.

[P.S. anyone who wasn't an author in this tome like to review it? - *Eds.*]

DECODA, a popular, Australian-written ecological database and pattern analysis package may soon be available in Macintosh form. Contact the author,Dr Peter Minchin, Department of Biogeography and Geomorphology, R.S.Pac.S., A.N.U., GPO Box 4, Canberra, 2601, phone (06) 249 511, e-mail PRM411@CSC.ANU.EDU.AU.

ANNOUNCEMENTS

The Australian Water and Wastewater Association 15th Federal Convention is to be held on the Gold Coast between 18-23 April 1992 and is now calling for papers. The venue is the Conrad International. For further information, contact Sonja van den Ende, ph (07) 2341993 FAX (07) 2247999.

The **7th International Symposium on Trichoptera** is to be held at Umea, Sweden, between 3-8 August 1992. Further information and registration forms available from Dr. A. Neboiss, Department of Entomology, Museum of Victoria, 71 Victoria Cres., Abbotsford, VIC 3067. Registration forms and abstracts should be submitted by 31 December 1991.

A Workshop on Sampling in Aquatic Environments: Collecting Valid and Representative Samples will be held at the University of Canberra between 29 April and 1 May 1992. Topics to be addressed include the physical, chemical and biological sampling of waters and sediments, the design of sampling programs, quality control to ensure representative samples and maintain integrity, sample storage procedures and innovations in the collection of water, biota and sediment samples. Enquiries can be directed to Dr. Bill Maher or Richard Norris on (06) 2522561 [FAX (06) 2015030]; Dr Simon Apte (02) 5433723, or Graeme Batley on (02) 5433325 [FAX (02) 5436774]. The approximate cost will be $150.

The **2nd International Conference on Reservoir Limnology and Water Quality** will be held in Ceske Budejovice, Czechoslovakia between August 9-14, 1992. The scope of the conference is to document a progress in understanding reservoir limnology and water quality management during the last five years (since the first conference). Topics include Key factors in Reservoir limnology; geographical aspects; biological interactions; eutrophication; decomposition; modelling; and tropical reservoir fisheries. Details and pre-registration forms from: Dr. V. Vyhnalek, Hydrobiological Institute, Na sadkach 7, 370 05 Ceske Budejovice, Czeckoslovakia before 30 December 1991.

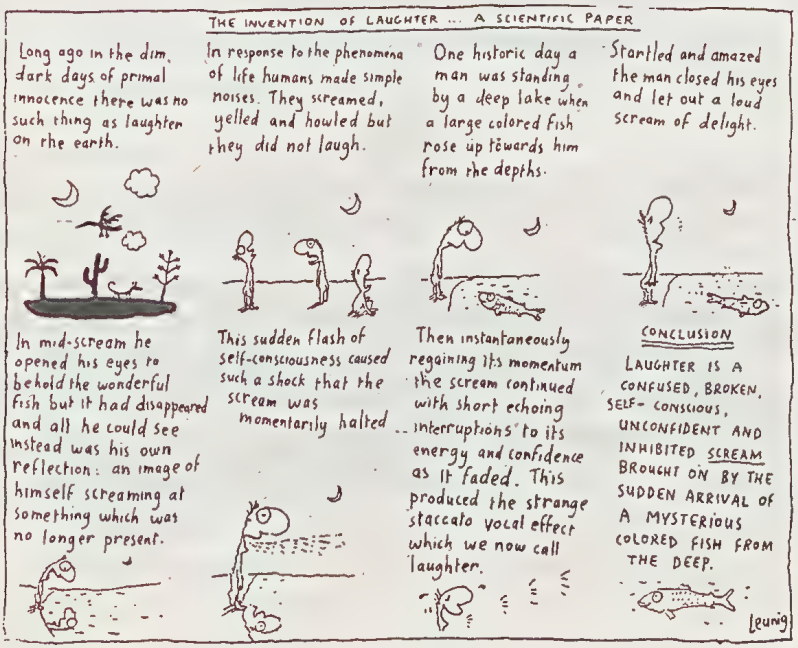
INTECOL'S IV International Wetlands Conference will be held in Columbus, Ohio, USA between 13-17 September 1992. The four main themes of the conference are: Global role and extent of wetlands; Ecological engineering and ecological monitoring of wetlands; Coupling of wetlands, floodplains and watersheds; and International approaches to management and policies for wetlands. Various excursions will be held, including the non-scientific intercollegiate American Football Match between the Ohio State "Buckeyes" and the Pittsburgh "Panthers". Details from Prof. A.J. McComb, Environmental Science, Murdoch University, Murdoch, WA 6150; or Prof. William T. Misch, Columbus '92

Wetlands Conference, The Ohio State University, School of Natural Resources, 2021 Coffey Rd., Columbus, Ohio 43210, USA. [Go "Panthers"!! - *Eds*]

Nominations called for 1992 Asahi Glass Foundation Blue Planet Prize for significant accomplishments in environmental studies. There are two categories: academic for "extremely advanced and highly original scientific or technical breakthrough" and development and implementation for "executing environmental projects, establishing and introducing environmental policies, concluding programs and conducting environment-related writing or media activities". Prize includes ¥50 million. Contact The Asahi Glass Foundation, Bank of Tokyo Building 12F, Marunouchi 1-4-2, Chiyoda-ku, Tokyo 100, Japan.

[Hmm... environment-related writing, eh? We could win a lotta bucks here; who wants to nominate us? - *Eds*.]

Aquifers at risk: towards a national groundwater quality perspective, 15-17 February 1993, Canberra; organised by ANU & BMR. Contributions invited. Contact Shirley Kral, ANU Centre for Continuing Education, GPO Box 4, Canberra 2601, ph (06) 249 4580, fax (06) 257 3421.


THE INVENTION OF LAUGHTER ... A SCIENTIFIC PAPER
Long ago in the dim, dark days of primal innocence there was no such thing as laughter on the earth.
In response to the phenomena of life humans made simple noises. They screamed, yelled and howled but they did not laugh.
One historic day a man was standing by a deep lake when a large colored fish rose up towards him from the depths.
Startled and amazed the man closed his eyes and let out a loud scream of delight.
In mid-scream he opened his eyes to behold the wonderful fish but it had disappeared and all he could see instead was his own reflection: an image of himself screaming at something which was no longer present.
This sudden flash of self-consciousness caused such a shock that the scream was momentarily halted
Then instantaneously regaining its momentum the scream continued with short echoing interruptions to its energy and confidence as it faded. This produced the strange staccato vocal effect which we now call laughter.
CONCLUSION
LAUGHTER IS A CONFUSED, BROKEN, SELF-CONSCIOUS, UNCONFIDENT AND INHIBITED SCREAM BROUGHT ON BY THE SUDDEN ARRIVAL OF A MYSTERIOUS COLORED FISH FROM THE DEEP.
Leunig

LIMNOLOGY BIBLIOGRAPHY

Thanks to all those caring (and publishing) limno's who sent papers or lists for this issue ..... long lists would be appreciated on disk (any IBM compatible format) simply to save time. Disks will be returned. [R.J. Shiel, ASL Bibliography, MDFRC, PO Box 921 Albury NSW 2640.]

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